SOCIAL OUTER LIMITS

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I N D E X

1. Introduction: an "outer limits" in general.

The concept of "outer-limits" is in need of some
clarification. Although this has been done many times before,
it has to be done for the purposes of the present analysis,
without deviating too much from other efforts to clarify the
concept.[1]

In general the problem to explore can be formulated as
follows: what is the topography of the region referred to
as "outer-limits"? below are some simple drawings giving
some impressions:

Figure 1: Some Outer Limits "topographies"

(a)

(b)

(c)

(d)

(e)

(f)

(g)

(h)

(i)
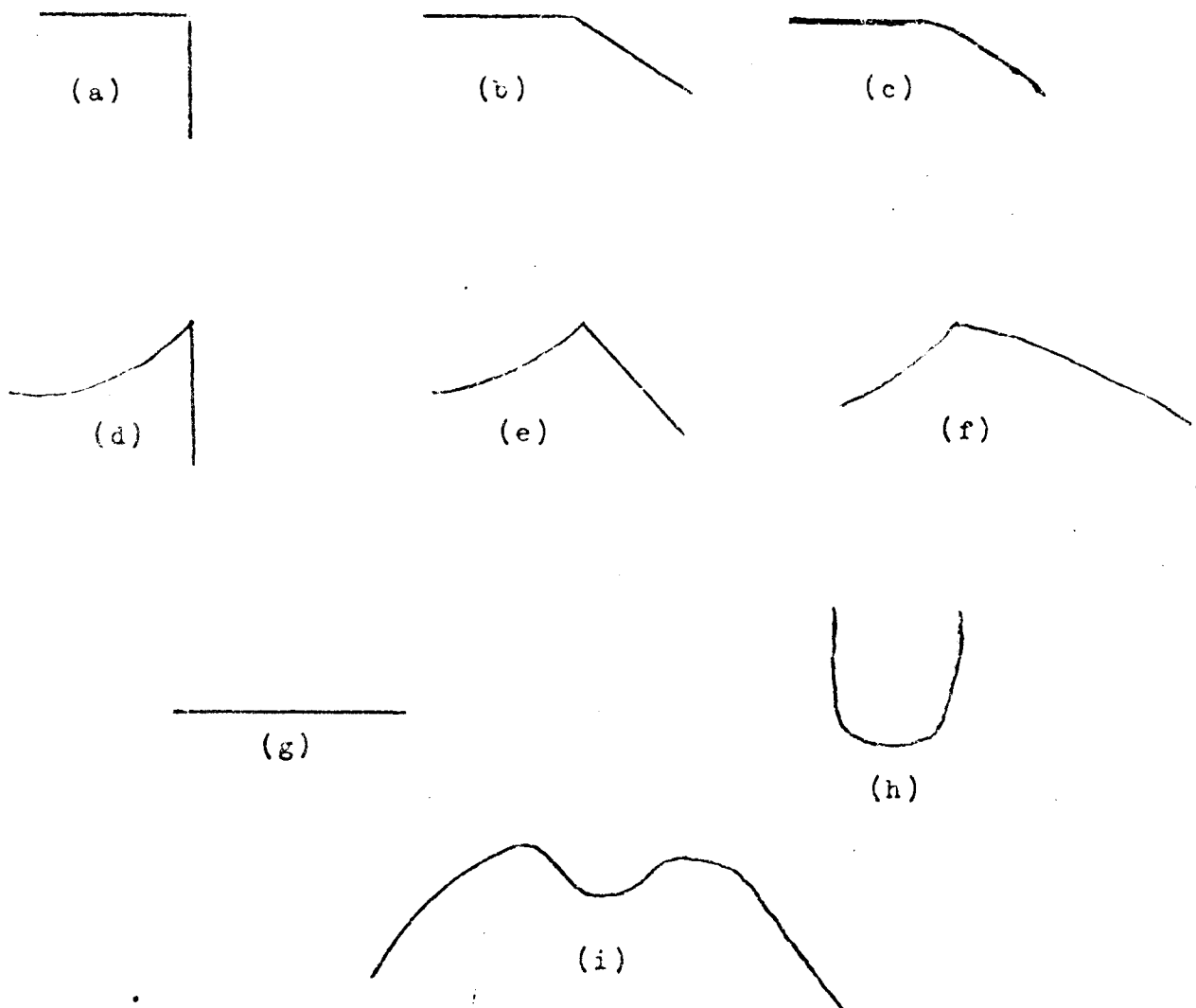
The first case (a) is the most dramatic one: without any warning signal the system comes to a precipice and jumps down, presumably irreversibly, irreparably destroyed. In case (b) the process is less abrupt, and in case (c) it first goes downhill so slowly that notions of reversibility, system repair, could be introduced in the picture.

The next three cases repeat this story except for the important point that before the limit has been reached the system has a built in protection, some kind of a wall, making the limit more difficult to attain. In cybernetics this is known as negative feedback, in mechanics as an element of stable equil.iorium, and in social sciences perhaps mainly known as "increasing costs". One good example would be a price mechanism that puts the prices of oil higher and higher as the bottom of the reservoirs is approached; another example would be elections or other expressions of popular disapproval of regimes embarking on disastrous policies.[2] In other words, the idea   these cases have in common is that there is some kind of built-in warning signal, which - when properly understood - might protect the system effectively against disruption. Nevertheless, however, it is envisaged that the system can be pushed over the brink by some uncontrolled forces, and disintegrate irreversibly, quickly or slowly - or, in the last case, so slowly that reversibility is conceivable.

It is important to contrast this with two "topographies" to which the notion of "outer limits" would not apply, cases (g) and (h). In the first case the system is free to move, there is no danger anywhere; and in the second case it is also free to move within a more limited area; then countervailing forces set in so effectively that the system cannot scale the wall and reach the limit beyond which there is no return.   These last two cases are known as indifferent

and stable equillibrium respectively (we have not included
a case of unstable equillibrium as it is unrealistic and un-
interesting as a model, systems do have some latitude).
And the last case, (i), is meta-stable equillibrium, combin-
ing some of the features of cases (d), (e) and (f). This
seems to be the most useful image of the outer limit topography;
there are countervailing forces when the limit is approached
(the system is not that cruel); the limit is not a point, but
a region, beyond that region a process of disintegration
takes place, but slowly in the beginning - there is still the
possibility of reversing the process - and then the system goes
faster and faster downhill.

These reflections lead to a well known distinction in
the general theory of outer limits; the difference between
transgressing the outer limits and deterioriation of the
countervailing forces/warning signals. A system without
warning signals may still be far from the outer limits; only
the problem is that the system doesn't know. And correspond-
ingly: a system with warning signals may be very close to the
outer limits but the processes, counteracting any further moves
in the wrong direction are already at work - be they automatic
processes or processes that have to be triggered by the human
individual or corrective consciousness. The problem is, of
course, in general, whether such countervailing forces are
strong enough and this is one important approach to the whole
theory of social outer limits.

Reflections like these serve to highlight one point:
it is important to know what kind of argument is made when it is
argued that a system is approaching its outer limits. Very often
the argument is made as if it is the "alarmist" case (a), whereas
in reality the situation may be more like (f) and (i). In fact,
only artificial mechanical systems are of type (a); complex
natural, biological systems more like (f) and (i). 3) We shall
in the following proceed as if social systems are closer to biolo-
gical than to mechanical systems, and make ample use of the distinc-
tion between trnasgression of outer limits and signal deterioration.

2. On "social outer limits".

The problem of how to define, even how to conceive of
"social outer limits" is different from the corresponding
problem for "human inner limits" and "nature's outer limits".
In the case of human beings there are such obvious limits: a
human being can withstand a certain physical destruction
but not too much, it can stand up against the destructive
powers of diseases but not too much, it can live sometimes
without food and other physiological inputs but not very
long. In general, human beings can be deprived of satisfaction
of material needs, and of non-material needs to some extent,
but sooner or later they become much less than human beings
can be - exposed to violence, to misery, to repression and
alienation - and will ultimately disintegrate, somatically
or spiritually. In other words, there are images of human
disintegration of many kinds, there are the stark realities
of human disintegration of more specific kinds.[4]) And the same
applies to nature: ecological limits are a reality, one may
discuss whether they are global or local, many dimensional or
one dimensional, and what is the topography around the limit,
but there is reality to the images.[5])

But what should be corresponding images for social
disintegration? Some cities have recently been referred to
as "ungovernable"; corresponding diagnoses have been made for
countries. But what does that mean? It might simply mean that
certain elites have difficulties getting their wills and
interests imposed upon the system; and if that is the case
perhaps not so much their needs as some of their wants are
left unsatisfied. In that situation it may very well be that
the needs and wants of some others are better satisfied than
before;[6]) in other words, the concept is problematic. And the
problem lies in the quest for a way of conceiving of "social
outer limits" sui generis, using social social level characteristics

alone, with no reference to the limits of man or nature or both.

It may also very well be that it is better this way.
For imagine a system of characteristics were developed de-
fining the social outer limits, a border line beyond which
any transgression would be seen as destructive of that society,
per definition[7]. In that case a social dogma would have been
created leading to either, or possibly both, of two negative
consequences. On the one hand it may very well be that the
border line is drawn too generously so that neither the human
inner limits nor nature's outer limits are respected within
the social outer limits; on the other hand it could also be
that the border lines are drawn so narrowly that social resources
are not sufficiently utilized so as to satisfy human inner
limits without transgressing nature's outer limits.

Thus look at the simplest of all characteristics of
human society: the number, N, of members. A society might
stipulate an upper limit for N; any number higher than that
being a transgression. There might be good reasons for doing
so: if N is very high, hierarchization tends to set in, almost
inevitably, and the individual human being tends to become
very small. From that it does not follow that if N is low
there will be no hierarchization, that every individual human
being will automatically loom high in the social landscape.
A relatively modest N would at most be a necessary condition.

But then the problem of viability: the low upper limit
of N might as a consequence impede better utilization of natural
resources through some system of division of labor, given the
technology we have. Thus, it is hardly possible to introduce
much of even very small scale[8] industry if the upper limit of N
should be something like 500. If the upper limit is 5,000 it
might be feasible (because even with a modest agricultural
productivity sufficient labor would be free for work in the
secondary, and ultimately also tertiary sectors of the society).

And that brings the analysis straight to the point where
it should be: the upper limit of N for some dimensions may
be below the lower limit of N (and the lower limit is also
an outer limit) for some other dimensions to be considered.
To stipulate once and for all a limit of N would rule out any
sensitivity to a problem of that kind, including the necessity
of making a trade-off between conflicting requirements. It
might also, incidentally, serve as a barrier against social
imagination in trying to transcend an apparent incompatibility
of that type, for instance by doing as the Chinese seem to have
done in their people's communes: having teams small enough to
make direct democracy possible, yet communes (federations of
villages) big enough to be economically viable at a certain level. 9)

But our conclusion is essentially that of trying to avoid
social dogma, and instead anchor thinking about social limits
in the consequences of any given social organization for the
human inner limits and nature's outer limits. To take an example
to make it more clear; Plato once had the idea that a society ·
should have 5,040 members. 10) In this particular case the lower
and upper limits coincided, the outer limits defining society
as a point with exactly that number of members. Why? Because
that particular number can be divided by a very high number of
other numbers, thus permitting the society to be sub-divided
in very many ways in equally big sub-units (fire brigades classes,
teams of any kind). In requesting this, Plato obtained what
he wanted to obtain: a sub-division with the harmony of being
equal in numbers. Later generations of social philosophers
have accorded to this characteristic considerably less im-
portance, one might safely say - but it certainly is a societal
characteristic sui generis, unrelated to human needs and nature's
needs, at least as these are conceived of by us today. And later
generations might also feel that our concern with parliamentary demo-
cracy and socio-economic formations - all of them sui generis -
also have an element of something magical, not coming sufficiently
in contact with fundamental aspects of the human condition.

The conclusion of all this would be to look for ways of relating social characteristics to the satisfaction of human needs and to the signals from nature. To do so one has to think about the satisfaction of human needs (the human inner limits) and ecological balance, to use one short formulation for nature's outer limits . **The alternative is social dogma, not necessarily in the platonic form. Maybe later, at some other stage in the development of social theory and practice, non-dogmatic conceptualizations of social outer limits may be developed, at the societal level as such - but today not. Hence some kind of deductionism is not only indispensable but desirable.**

3. The social outer limits, where are they?

In the preceding sections the job has been simplified: the con-
cept of social outer limits has been reduced to the question of
finding how far a society can be pushed in any direction without
some negative consequences for the human inner limits, both in
the sense of meeting basic material needs and meeting basic non-
material needs; and in the sense of negative consequences for
nature's outer limits, upsetting the ecological balance. One
might now go one step further and say that even the concept of
nature's outer limits should or could ultimately be seen in terms
of the consequences for the human inner limits. It is not
important for what follows to have a stand in this difficult issue,
but our guideline in assessing what constitutes ecological
balance would essentially be in terms of what is good or bad for
human beings.[11] A deeper relation to nature would no doubt have
given occasion to thinking and acting in terms of ecological
balance as a condition for maintaining basic qualities in nature
per se - one difficulty with that would be to clarify exactly
what this "per se" is.

In short, this means that we shall explore the three rela-
tions in the triangle below:

Figure 2.   The Society - Nature - Man triangle
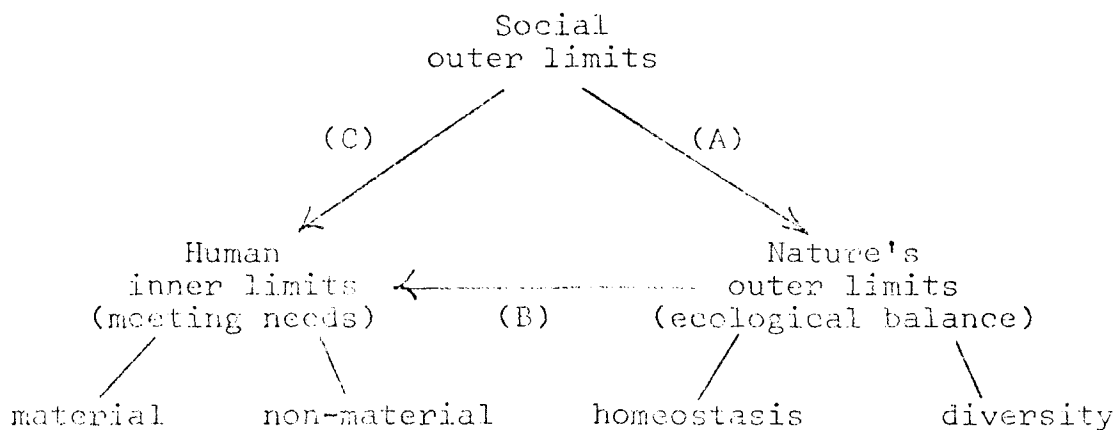
In a sense this is an expression of the old homo mensura thesis
(Protagoras); the idea that man is the measure of all things.[12] In
commenting on the triangle we shall proceed with the three arrows
in alphabetical order. Needless to say, to do so will be an
exercise in brevity: books, libraries can be written on each

arrow; the present is an effort to focus on what is essential exactly in locating social outer limits.

(A) Society's impact on nature

Characteristic of ecological balance is the notion that processes are cyclical, that the constituents that enter into a process ultimately are recreated and fed back into the same process again. Organic compounds of the kinds found in nature are ideally suited for this purpose. They consist of a small number of different atoms, usually low in atomic weight, and they are tied together in molecules in a way that makes them degradable when exposed to enzymes found in nature, and other "forces". Carbon dioxide and water play an important role as the result of these decomposition processes and are combinable again through photosynthesis resulting in increasingly complex organic molecules. At some step life is formed, followed by death and decay and decomposition. The process has a high level of built-in stability, but there is also instability not due to human interference, as witnessed by the fact **that nature also** changes considerably in the absence of man's presence.

Man can live off the cyclical processes in nature when exercising household.[13] At this point it seems more easy to formulate this concept negatively than positively: it may be more clear what one shall not do than exactly what one should do. Thus, if cyclical processes (with a high level of homeostasis) are disturbed in such a way that they even become linear, meaning that the process comes to a dead end with constituents that do not recombine, starting the process again - then nature has been, **perhaps,** pushed beyond its outer limits from a human point of view.[14] And similarly, if diversity is reduced by eliminating species, vulnerability of the total system is likely to increase.[15] A variety of species of roughly "the same kind" will have a higher likelihood of standing up to variations (e.g. climate, or pests) in external natural conditions. In short, a switch towards linear processes combined with reduction of variability might cause severe difficulties, **perhaps best summarized as "loss of maturity".**[16]

The question, then, would be to try to identify those social factors that might have such deleterious consequences. Broadly

speaking they might be referred to as "industrialization" and "modern science" - but other factors may also have had or have the same consequences - only that these two are prominent on the present world scene and for that reason merit special attention.

What industrialization does to nature is above all to introduce new processes not previously found, and to a large extent linear ones. Some of this is due to the high emphasis on inorganic material, for instance ferrous metals. Components are fed into the process and components are taken out, but the latter do not decompose and reintegrate in such a way that the process can be started all over again. The accumulation of slags outside pits as opposed to the way in which farmland can be regenerated, bears some testimony to the degree of linearity introduced through industrialization. When a process is linear it will by definition deplete in one end and, possibly, pollute in the other - depending on whether the final products are seen as toxic or not. What has been said actually also applies to industrial production of organic, non-natural materials: they are also less degradable (PVC being an example) due to the absence of natural enzymic systems.

It should be noted that in the above reasoning it is not actually linearity as such that is the difficulty but linear processes where the inputs are depletable (meaning non-renewable) and (some of) the outputs are pollutants, meaning toxic or harmful one way or the other. One might also imagine linear processes based on renewable components, ending with an increasing pile of products that are useless and non-degradable, but not harmful. It should also be mentioned that there is hardly any law of nature saying that industrial processes have to look so different from agricultural processes. First, man has much more experience with the latter than with the former and may have learnt to handle "waste" products better. Maybe that is what he is learning today for industrial processes, and that ultimately he will change the course of the linear processes through some non-natural mechanisms and tie them together in neatly balanced cycles. Conversely, not all agricultural processes are cyclical, homeostatic either, as evidenced by many examples in human history, and by the use of artificial fertilizers today - but here it might be added that the latter are examples of industrial processes being fed into the agricultural, nature-based, ones. **17)**

However, as a statement of today's situation what has been said above may nevertheless be useful. And the impact is compounded by the consequences of another factor: <u>expanding economic cycles</u>. By that is simply meant that there is a transportation/communication revolution adding to the industrial revolution, making it possible to process raw materials far away from the places where they were extracted from nature, and to consume them far away from the places where they were processed. The economic Nature-Production-Consumption triangle has now expanded to the point of encompassing the whole globe for many of its citizens and for many products, thus making it nearly impossible for any one along that cycle to assess correctly the ecological impact of his action, be that extraction, production or consumption. But this, in turn implies that a number of small "natural" mechanisms for counteracting ecological imbalances, meaning essentially depletion of important ingredients and pollution of human beings, and nature as well, have been destroyed. It is easier to monitor a number of small economic triangles where the people who cause the imbalances are themselves suffering the consequences, and for that reason reporting and acting in their own interest, than to establish world-wide monitoring systems based on more abstract relations than the simple feed-back mechanisms of human self-interest where the causal agent is at the same time morally responsible in a way obvious both to himself and to others. After all, it has probably been because of this mechanism that the basic unit of human production, the farm, has survived so successfully. [18)]

Let us then turn to the problem of diversity and ask the question what aspect of "modern science" would be relevant in this connection. Modern science is able to describe and classify, to analyze and relate. It will be able to establish typologies of species, thereby yielding images of diversity. The reduction of diversity may enter at another point in the scientific construct: in the search for optima. The point is not only that the scientific mind might ask questions like "out of these twelve strains which is the better one, on the average, given a variation in conditions and the needs they are supposed to meet?". The point is also that modern science is capable of giving an answer, and once that answer is given the temptation to overemphasize that particular species at the expense of others will serve as an important motivating force. At this point there is an intimate

connection between the scientific search for general laws, in this
case relating to optima, and the industrial need for formulas under
which standardized production may take place. The artisan mode
of production is much more open to variability given the non-
standardized way in which things are produced; the industrial
mode has other requirements. Thus, one would expect industry and
modern science to develop hand in hand, the former putting
questions that the latter can answer and the latter providing
formulas that the former can make use of. When this alliance is
implemented into social practice the net impact on nature almost
has to be negative from an ecological balance point of view, both
in terms of destroying homeostatic mechanisms through the intro-
duction of linear processes, and by reducing diversity. To this
should then be added the expansion point: industrialism through
modern economic arrangements becomes world encompassing and
modern science, through the doctrine of universal science, equally
so. **Industrial mass production peesupposes general - if possible
optimal - formulas of production, it has to be standardized, based
on raw materials that are homogenized in a uniform way. Consequence:
maturity lost - to some extent forever; and science brings it about.**

(B) <u>Nature's impact on human beings</u>

Nature is the ultimate supplier of goods that enter into the
production of foodstuffs, clothes and shelter, medical care and
schooling and means of transportation and communication. When
ecological balances are destroyed conditions exist for a "run-away
world" and the four danger areas highlighted in the recent UNEP
report are good examples.[19] Thus, fluorocarbons may not be so
toxic in and by themselves, but the effect in depleting the ozone
layer absorbing much of the ultraviolet radiation from the sun,
thereby exposing human beings and other forms of life to these
rays is an example of how a balance with which human beings could
live is being destroyed. To this should be added the use of
nitrogren fertilizers, converted into nitrogenoxides The way
this might show up in human beings would be in the form of skin
cancer.

It is now commonly assumed that many forms of cancer are
brought about by "environmental factors", meaning through the
production of pollutants, whether they are defined as industrially

useful products from a consumer point of view, or as waste products.
One day we may perhaps be able to understand better the difference
between "natural" and "non-natural" products; today it looks as
if an increasing number of the latter is appearing on the lists
of more or less proscribed items, for each month, not to say for
each week. [20]

If these two danger areas could be classified under the broad
heading of "pollution", the other two - firewood shortages and
soil loss - fall under the heading of "depletion". The shortage
of firewood has to do with the protection of human beings against
hazards of climate - clothing and housing being two ways of main-
taining temperature balance, heating a third method. The loss of
soil obviously relates to the production of foodstuffs, soil
being a precious commodity that has been so undervalued in the
past that it still seems difficult for human beings to evaluate
it properly.

So far for material human needs; what about the non-material
needs? Of this we seem to know very little. Imagine that we
classify non-material needs in to broad categories, "freedom" and
"identity", identifying the former with having options, choices
and the latter with closeness, then there must be at least some
connection. [21] In an increasingly hostile nature, meaning a nature
dangerous to man because of human intervention, the range of
options as to where to live and where and how to move will
decrease. And in a nature increasingly depleted and polluted
closeness to nature, even to the point of an identity that some
might refer to as "mystical", will probably also be increasingly
difficult: it is easier to identify with a friendly than with a
highly hostile natural habitat. [22] As a consequence man will probably
withdraw into non-natural environments and see nature through
protective devices, wrapped in plastic, with binoculars, on the
TV screen, from the airplane window, etc. However, we know very
little or nothing about what this means to human beings beyond
intuitive guesses: if we ourselves come from nature and are a part
of nature, then this must somehow be tantamount to being cut off
from our roots. **Somewhere there must be a difference between the
eskimo adapting by using furs and city-dwellers by using gas masks.**

Thus, one would imagine that there is a closer connection
between life in nature and mental health than the famous "mens sana

in corpore sanem" according to which the connection would be via exercise and sports. May be one day we shall be able to demonstrate that there is **also direct** connection between mental health and closeness to nature, **not via** the possibly positive impact of physical, somatic health derived from life in nature.

(C) Society's impact on human inner limits

An abundant nature, even more than able to meeting everybody's material needs on the average without nature's outer limits being overstepped is only one necessary condition; another necessary condition being that the socially determined distribution is not made in such a way that those who get least get less than the minimum needed. But then there enters obviously, a third necessary condition: the number of members of society. Even a perfectly functioning nature from an ecological balance point of view, and the most equitable distribution system from a societal point of view, will be insufficient if the population pressure on the resources is too high. Hence, N reenters in social analysis via the idea of "population pressure" but only under two conditions: that the other necessary conditions are met. Non-satisfaction of basic material needs, for instance in the form of serious under-nutrition, should not be seen in terms of population pressure when it could also be seen as the consequence of mismanagement of nature, seriously depleting natural resources and polluting the environment, or as the result of inequitable (exploitative) distribution of goods and services. Thus, we are immediately led to recognize two types of social outer limits: the degree of exploitation (here simply defined as asymmetry or inequality in the distribution of goods and services), and the level of the population pressure, defined as the population in excess of the maximum that can have its basic needs met under assumptions of equitable distribution and proper management of the environment. Since these two assumptions are rarely met talk about population pressure could and should be seen as ideological, concealing the deleterious operation of the other two factors, **in most cases.**

What, then, about non-material needs? If cancer is seen as an indicator of the presence of pollutants - in a broad sense - then mental illness may perhaps be seen as an indicator of the lack of satisfaction of basic non-material needs, and about the distribution of mental illness at least something is known.[24] The key factor here may not be degree of exploitation or population pressure, but social structure. For simplicity, let us divide social structure into two types, to some extent building on such traditional dichotomies in sociological literature as Gemeinschaft-Gesellschaft, folk-urban, modern-traditional, and so on - and refer to them as Alpha structures and Beta structures:

Table 1. The basic structural types: definitions

|	Shape	Inter-human relations	Intra-human relations	Size
Alpha-structures	Centralized, fragmenting	Marginalizing	Segmenting	Unlimited
Beta-structures	Decentralized, solidary	Participatory	Integrating	Limited

The Alpha structure is that of a corporation, national or transnational, or a bureaucracy, governmental or intergovernmental. It is centralized meaning that people come together at the top, but are kept away from each other, fragmented at the bottom. It is marginalizing in the sense that the people at the top constitute first class members, those who are "in" - those at the bottom are second class. It is segmenting in the sense that people make use of only a narrow segment of their personality, meaning that at the bottom people are not only split away from each other but split away from themselves through subdivision - the proto-typical example being the workers at an assembly line. As to size the structure is unlimited: it can add any number of members simply by adding one new layer of mutually fragmented, marginalized and segmented individuals at the bottom.[25]

The Beta structure is the opposite of all this. It is decentralized, more based on some type of solidarity of everybody with everybody else. It is also participatory in the sense that

there is no such sharply drawn borderline between first and second class members. People have occasion to use much more of their personality - but as a result of all this the size is limited. Examples are numerous: extended families, farm households, communes, kibbutzim, many of the world's villages and so.

Schematically the two structures look something like this:

Figure 3. The basic structural types: diagrams

Alpha: Beta:
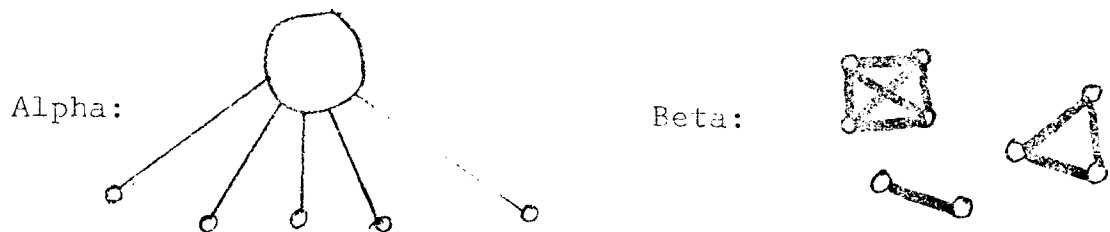
As an example may serve a school: Alpha is the way the school is organized from a formal point of view with a corps of teachers; Beta is the informal organization of pupils in small friendship groups.

This example can now be used to make a basic point: each society is a composite of both Alpha and Beta structures, or to be more precise: each modern society can be seen in such terms. By "modern", then, is meant the type of social formation that emerged in Western Europe after the transition from feudal organization to state organization with a bureaucratic center, and after the transition from artisanal modes of production to increasingly centralized industrial production as the dominant theme. And the basic thesis, using these conceptual elements, would be that the last two centuries of Western European/North American history (increasingly emulated in most other parts of the world) is the history of how Alpha has grown and solidified and how Beta has been pushed into the background of the society, ultimately reduced to tiny, non-self-sufficient groups such as the nuclear family and small friendship circles. 26)

Before proceeding with this type of analysis it should be noted that nothing has been said so far about the variable of exploitation alluded to above. Thus, there is no assumption that the Alpha structure is necessarily exploitative. On the contrary, the type of structure best known to distribute goods and services

more equitably/equally is probably the welfare state, itself an
Alpha structure. Conversely, there is no assumption that the
Beta structure is necessarily horizontal: enough is known about
village despots and family tyrants to invalidate any such
assumption. Nor is there any simple relation in the sense that
Alpha is rich and Beta is poor: both of them may be both. They
are simply two different ways of organizing social affairs, and
not incompatible with each other, they may to some extent coexist
and probably in much more complicated fashions than in the combi-
nations realized so far in the transition from an essentially
Beta dominated society 3-400   years ago or so to an
essentially Alpha dominated society today. With other parts of
the world than the North Atlantic area used as an example these
figures would of course have to be changed - and there are also
plenty of examples in human history of Alpha structures disinte-
grating, giving rise to more pure Beta structures.

Since the most important Alpha structures today are the
(trans)national corporations and the (inter)governmental bureau-
cracies an analysis of the impact of the Alpha structure would
predominantly be in terms of these particular implementations.
No clear-cut conclusion can emerge from any such analysis when
it comes to human inner limits. On the one hand such structures
may guarantee (somatic) security for its members within its borders,
but it may also lead to considerable insecurity through increased
capacity for warfare, both external with other structures of the
same type, and internal with anti-center forces. Correspondingly,
the Alpha structure may be good at producing an astounding
variety of foodstuffs, clothes, shelter, medical equipment, and
schooling devices, and at distributing them equitably - but also
at wasting resources, ravaging nature and extracting surplus,
exacting taxes and in general exploiting vast groups within its
confines. Alpha may guarantee freedom, but also be the most
efficient in repressing it. An finally: Alpha may give identity
to its members, corporate or national, but is also so vast,
fragmenting, marginalizing and segmenting that individual members
are likely to loose contact with their own work product, with
themselves, with others, with society at large, with nature, and
ultimately with such transcendental elements as God, and Meaning
(with life).

All these negative, possible and even probable consequences of Alpha can be to some extent counteracted if there is also a strong Beta structure operating.[27] It may serve as a protection against internal and external warfare, as evidenced so clearly when people are able to resort to somebody, somewhere during stress occupation and other calamities. It may constitute additional ways of growing food, providing for clothes and shelter, for health and education - again as witnessed during wars. Freedom may become meaningful at the micro level rather than at the macro level since the options available at the macro level (free speech, freedom of association) may remain abstract for many people, but not so at the micro level (freedom in choice of whom to love and be loved by). Moreover, Beta seems by far to be the best in providing identity, particularly if work is organized in a more artisanal manner (like in a work collective of intellectuals, doing a job together as a team), with everybody participating, everybody performing a variety of tasks-but the total number being so limited that everybody has some kind of understanding of what everybody else is doing, some kind of empathy and sympathy.

But then the negative aspects of Beta: an easy prey to external aggressive forces, very much dependent on the hazards of nature, freedom being circumscribed by the ease with which despotic control can be exercised in small groups, not giving to people the anonymity of a city, a corporation or a bureaucracy, and identity in the sense of conformity being stifling. There will also easily be a lack of dynamism, especially if the small Beta units live in mutual isolation, and a high degree of difference in level of living from one Beta unit to the next, not to mention the danger of unmitigated inter-Beta rivalries.[28]

In short, the total picture is a mixed one. But that does not mean that it is impossible to think in terms of social limits Although much of this reasoning is intuitive, what emerges as a conclusion would be something like this: the two extremes of a pure Alpha structure or a pure Beta structure should probably be avoided, which means that there are two limits - one against too much Alpha and the other one against too much Beta. With too much Alpha the negative consequences will probably above all show up in terms of mental illness (loss of identity) and dependency of the center; too much Beta will probably show up in terms of too

much dependency on nature and poverty, at least in the units that
are least fortunate, because nature is far from abundant or the
distribution of goods and services is far from equitable or the
population is too high in number. Diagrammatically it would look
something like this, with a lower limit and an upper limit:

Figure 4. Two social outer limits
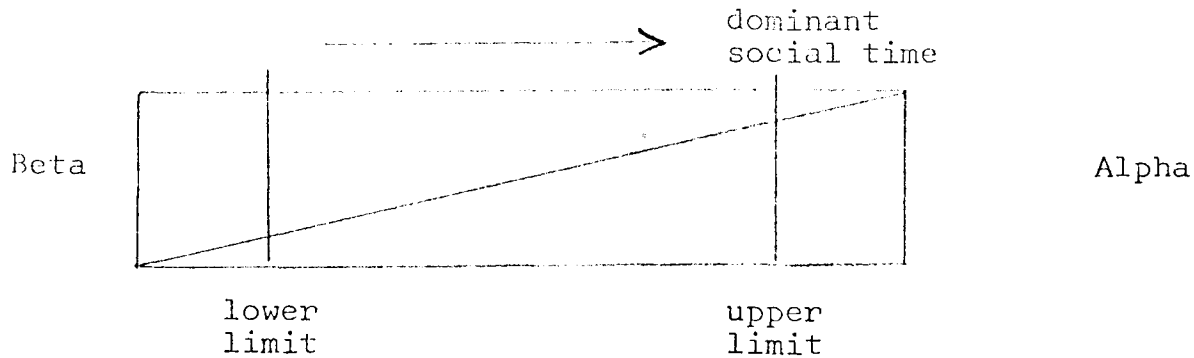
One major difficulty in this connection is the way in which
the transition from a Beta-dominated to an Alpha-dominated social
formation has been identified with "modernization", even with
"development".[29] The enthusiasm in breaking through the lower limit
and making more goods and services available to greater numbers,
even with better distribution than was possible in small Beta
units highly dependent on nature, has overshadowed the care that
should be exercised when the upper limit is approached.[30] If "bigger
is better" and "Alpha is unlimited in size", then bigger Alpha
is better - and this simple logic has been reinforced by Alpha's
tendency to grow more or less automatically when that growth is
not very consciously impeded.[31] All of this has then been tied in
with the Western idea of progress, and in the social science
approaches to development of the 1950s and 1960s even been seen as
basic keys to development, in a rather unquestioning manner. The
"universalism" and "specificity" of the parsonian social analysis
of the 1950s have to do with the ways in which a corporate/bureau-
cratic center can deal with great masses of people, according to
universalistic criteria based on a very small segment of individual
personalities.[32] The Beta structures would exhibit more particularism
and diffuseness, not only permitting but encouraging people to
relate to each other in terms of their entire personalities, and
in non-uniform manners.

But, one may ask: would it not be possible for both Alpha and Beta to grow simultaneously? Within a limited range possibly, yes, but not indefinitely. The reason for this is that human beings have a limited capacity to interact with others, as witnessed by the tremendous difficulties most people in modern societies have in allocating their time and energy between such spheres of life as work and family, the former probably Alpha, the latter probably Beta. Hence, if one of them grows it will sooner or later be at the expense of the other. This is actually quite clearly seen in the antagonistic relationship between regular citizens and hippies at the end of the 1960s: the former were Alpha oriented and the latter Beta oriented, and neither had much time or energy to devote to the other form, hence little comprehension for each other (except that most of the hippies had an Alpha background not mirrored by a Beta background among the ordinary citizens).[33]

Consequently a basic task in social analysis today seems to be to try to locate more precisely not the upper limit as a point, but as a range, a region. It is not enough to paraphrase the Bible, saying "give Alpha what Alpha's is and Beta what Beta's is" - something more should be known about how much to Alpha and how much to Beta. We assume that the emergence of Alpha in a Beta setting was one of the conditions for meeting many of the basic material needs, if for no other reason simply because only Alpha is able to distribute more equitably, thus overcoming some of the asymmetries in nature's economic geography. But we also assume that continued Alpha growth will sooner or later lead to Beta deterioration and to an exposure of individuals to the strength of Alpha radiation without being protected by a layer of Beta closeness - to draw on the ultraviolet rays/ozone layer **metaphore.**

Let us now try to explore some of the links between this type of analysis of societies and problem area A above. What are the impacts of various mixtures of Alpha and Beta structures on the ecological balance?

Again the conclusion would have to be a mixed one. There is hardly any simple answer: both are able to deplete and pollute, but only Alpha is able to do so on a major scale.[34] Industry as we know, and the expanding economic cycles referred to above, and

in addition to that also modern science organized in such a way
as to have a symbiotic relation to modern industry, are likely to
be organized in Alpha structures. But Alpha structures are also
able to counteract some of the deleterious effects of its own
operation, through the introduction of recycling devices to
counteract depletion and cleaning-up technologies to counteract
pollution. The suspicion will remain, however, that since this is
done by means of Alpha structures less sensitive to the delicate
nature of human relationships and mental balances what Alpha in
fact is doing is to produce other types of environmental problems,
for instance by substituting thermic pollution for other types
of pollution. Alpha's ability to hide such problems in remote
corners of the world geography or global and domestic social
structures is well known, and may easily pass as a solution to
environmental problems. Beta has fewer such opportunities, being
smaller in scale and operating in a more transparent manner.
Moreover, Alpha is likely to react in a uniform manner. Being
potentially and very often also factually world encompassing
Alpha is likely to come up with one solution presented as _the_
solution to an environmental problem, translating general natural
laws into uniform social regulations. There will be a quest for
uniform standards of operation that may be a travesty of the
complex nature and particular aspects of the problem from one
place on earth to the other. **But Alpha is known to produce such
standards.** 55)

Beta will avoid this difficulty since there is no centralizing
pressure on the units to become uniform. The ecological principle
of diversity is practiced among the units, thus offering a
possibility of different approaches to the same problems, meaning
that there would be more experience to draw upon. The techno-
logical capacity for large-scale recycling and cleaning-up
technologies will probably be absent, but Beta will have something
else to rely upon: a monitoring system that can give ample
warning beforehand. The economic cycle is small enough to
permit most people to see the consequences of their own ecological
actions and act accordingly - assuming that very few people want to
destroy the ecological basis of themselves and their offspring,
except in times of tremendous duress. Beta would also be less able
to start industrialization and large-scale distribution processes,
and for that reason more likely to base its economic practices on
siphoning off some economic fruits from the cyclical processes
given in nature. **Beta has to blend economic cycles and eco-cycles.**

All this seems to point in favor of Beta, but a nagging
problem remains: the strain put upon the people who are exposed
to a **very harsh** nature, and they are numerous. It is not
sufficient to say that "they can move away from such places", for
the simple reason that the degree of hospitality of nature is not
a constant function of time; **there are seasonal variations. Human**
beings have tended to move away - thus, the number of inhabitants
of deserts is not very high, nor of permanent snow deserts. So
we are left with the same conclusion: the transition from pure
Beta to mixed forms may be a blessing in the sense that it can
equalize life opportunities better, but at the expense of becoming
dependent on a center rather than on nature. And this center may
then cause as much or more environmental havoc than it was
expected to counteract, because of what it does to homeostasis and
diversity. It is then assumed that beyond a certain Alpha strength
comes a point where Alpha will always generate its own problems
and solutions that in turn generate the same type of problems. At
that point, clearly, the outer limits of society have been reached,
according to our criteria.[36)]

4. <u>The cultural outer limits, where are they ?</u>

So far our reasoning has to a large extent been structural.
But social structures in general, and in their relation to
nature in particular, should be evaluated relative to the
ethos in which they are operating. A useful metaphor here
might be to draw a parallel to the relationship between a
computer and its program. The computer is full of possibili-
ties, like a structure - the program limits the range of
possibilities, pushes the computer in certain directions,
may be overutilizing some of its capacities, underutilizing
others. The ethos (culture, cosmology) of a society (civili-
zation) is the program that puts the structure to work. Thus,
an alpha structure may be found both in expansionist and
stability-oriented cultures; the difference being that in the
former the alpha structure will itself expand, adding layers
of concentric circles from a center, in the latter the alpha
structure may remain constant. Correspondingly for the beta
structure: in an expansionist culture the beta structures
may relatively soon collapse or become marginal pockets in
the society at large; in a status quo-oriented culture they
may develop quickly, multiply and flourish.

Hence, an important question to be asked in any discussion
of social outer limits would be in what direction the ethos
would push the structures, and more directly what kind of
relationship the ethos would define between man and nature.

Two authors who have dedicated themselves exactly to these
problems are the historian Lynn White jun.("The Historical
Roots of our Ecologic Crisis", Chapter 5 in <u>Machina ex Deo</u>,
The MIT Press, 1968, pp. 75-94), and Huston Smith in several
essays ("Accents of the World's Philosopies", <u>Humanity</u>, no.50,
pp. 7-19); and "Tao Now", ("An ecological testament", Chapter 5
in <u>Earth might be fair</u>, 1962, pp. 62-81).

One basic point made by Huston Smith is that there seems to
be some kind of division of labour between three of the con-
temporary world civilizations: the Western, the Indian and
the Chinese. Using Bertrand Russel's idea that man is engaged

in three conflicts, against nature, against other men,
and against himself , he arrives at
the conclusion that western civilization is specializing
in the first, Chinese in the second and the Indian civi-
lization in the third of these arenas of conflict. "Western
man has been, par excellence, the natural philosopher";
"China, on the other hand, became the social philosopher"
and "neither China, nor the West has given a fraction of
India's attention to the mind. Historically, then, India
rightly deserves the title of the psychological philosopher".
His theory behind this division of labour is that the ci-
vilizations were faced with some problem areas that were
simply too untractable, such as nature for the Chinese and
for the Indians - Smith's assumption being that nature was
more manageable for Westerners, and "the Western tradition's
preoccupation with nature seems traceable to the hospitality
of its cradle environment, significantly christened the "Fer-
tile Crescent "".

However, and now comes the basic point which is developed
more in Smith's paper on Taoism: to be a specialist in
nature does not necessarily carry with it environmental con-
cerns or depths. On the contrary, precisely because nature
was tractable to western man,western man developed certain
habits in his way of trying to come to grips with nature
that in and by themselves have been a major source of diffi-
culty. Smith points to five elements in "The West's Compulsion
to disengage from nature, to break from its womb and launch
on an independent career") Tao Now, pp.67-69 : Clarity in
making distinctions, generalization, conceptualization
(meaning abstraction) implication (meaning theory formation)
and control : "the distinction between the way things are and
the way they should be reordered, and the distinction between
what is to be controlled and what will remain stable to pro-
vide footing for the operation".

What then follows is the idea that a tractable nature
leads to a science of nature which leads to control of
nature which leads to interference with nature which leads
to destruction of environmental balances in nature which
leads to a less tractable nature which leads to more
challenge to natural sciences in order to control even
further nature which leads to - - - what ?

One does not have to agree with Smith in order to arrive
at the type of conclusion just arrived at. For instance,
one does not have to identify western natural science with
"natural science" in general; there may be other approaches.
What seems clear, however, is that western science has a
tendency to develop forms of understanding where highly
complex "systems" are conceived of a relatively low
number of variables, these variables are then related bi-
laterally in relations of condition-consequence, these re-
lations are tied together in theoretical frameworks, usually
with an attempt to arrive at some kind of axiomatic system;
all of it with the intention of producing universal science,
valid at all points in geographical space at all points in
historical time. These three characteristics, generalization,
abstraction and theory-formation certainly combine into
something very powerful when it comes to transforming nature,
but at considerable costs.

One way of conceiving of these costs would be as follows:

                        in order to abstract, western
natural science creates what Smith refers to as a distance
relative to nature, in fact so much that western natural
science in a sense is not about nature but about some kind
of artificial nature, operating under artificial conditions
where everything is simpler (no friction, no heat losses,
no energy dissipation in general, etc.). When western man
then returns from his laboratory to real nature it is almost
impossible for him not to treat nature as if it were iden-
tical with that artificial nature, and the net result would
not be   more sensitive   to specific conditions (less
generalizing), more holistic (less abstracting), and more

casuistic (less inclined towards theory-formation).
It is easily seen that in choosing so unambiguously one
side of the dilemma represented by these two extremes
rather than a balance between them considerations that
might lead to a more harmonious approach to nature will
easily escape, and "laboratory conditions" reinforce this choice.

In saying so it should perhaps be emphasized that the
alternative to western natural science is not its negation,
the other horn of the dilemma, but a fruitful dialectic
between the two. In the West, however, if one should attempt
a broad generalization, dilemmas are perhaps less internali-
zed inside persons, more shaped as polarization between
persons. Typically at present the distance between natural
scientists on the one hand and ecologically oriented counter-
-cultures on the other is considerable, and among other
things built around the two epistemological poles indicated
above. It is tempting to believe that in a civilization such
as the Chinese, because of the particular amalgam of currents
that have contributed to that civilization, such inclinations
can more easily be located within a person, in some type
of balance alien to the western mind. Of course, one ex-
pression of this is what in contemporary China is referred
to as "walking on two legs", also seen in some of the Chinese
approaches to environmental problems - evidently combining
relatively western recycling and cleaning-up approaches with
a more age-old holistic, deeper approach to nature. In the
West this would take the form of mutually opposed groups
referring to eachother as "establishmentarians" and "eco-freaks"

Lynn White jun. takes this argument further by tying. it to
Christianity. He asks the question (p. 85):"What did Chris-
tianity tell people about their relations with the environ-
ment?" His answer: "Christianity inherited from Judaism not
only a concept of time as non-repetitive and linear but also
the striking story of creation. - - - God planned all of
this explicitly for man's benefit and rule: no item in the
physical creation had any purpose but to serve man's purposes . - - -

Especially in its western form, Christianity is the
most anthropocentric religion the world has seen. - - -
  Modern technology is at least partly to be explained as
an Occidental voluntarist realization of the Christian
dogma of man's transcendence of, and rightful mastery over
nature - - - Our science and technology have grown out
of Christian attitudes towards man's relation to nature
which are almost universally held not only by Christians
and Neo-Christians but also by those who fondly regard
themselves as Post-Christians . - - - If so, Christianity
bears a huge burden of guilt .

Again, one does not have to share Lynn White jun.'s assump-
tions in order to arrive at similar conclusions. The present
author would prefer to talk in terms of a general western
cosmology capable of transforming almost any ideology or
pattern of thoughtinto a particular shape. Thus, it is doubt-
ful whether orientally inspired Christianity really
conform to Lynn White's images, and he himself offers some
doubts in this connection.Thus, he mentions very explicitly
(p. 91): "Possibly we should ponder the greatest radical
in Christian history since Christ: St. Francis of Assisi.- --
The key to an understanding of Francis is his belief in
the virtue of humility not merely for the individual but for
man as a species. Francis tried to depose man from his
monarchy over creation and set up a democracy of all God's
creatures. - - - He urged the little birds to praise God
and in spiritual ecstasy they flapped their wings and chirped
rejoicing." But when the author adds that "the prime miracle
of St.Francis is the fact that he did not end at the stake"
then one might disagree: St.Francis was an expression of
medieval western cosmology, to a large extent the negation
of western cosmology in the antiquity and in our "modern"
times. When   "the Franciscan doctrine of the animal soul
was quickly stabbed out" then this might be seen as an ex-
pression of a much more general phenomenon: a dramatic change
in general western cosmology after the medieval interlude,
the oriental phase in western history, into the cosmology
we know today. Thus, when Lynn White jun. says: we shall

continue to have a worsening ecologic crisis until we
reject the Christian axiom that nature has no reason for
existence save   to serve man" one might agree that this
axiom has to be rejected, but not that it is tied to Chris-
tianity as such, but to occidentalized Christianity. Which
does not mean that one cannot agree with Lynn White when
he concludes his famous article/chapter with the words:
"We must rethink and refeel our nature and destiny. The
profoundly religious, but heretical, sense of the primitive
Franciscans for spiritual autonomy of all parts of nature
may point the direction. I propose Francis as a pagan
Saint for ecologists"

The difficulty with that kind of reasoning, however, is
that it is certainly not easy to "rethink and refeel" our
nature and destiny". There are methods for controlling
social structures, for building new ones - all of it built
into our political tradition. It can be done more or less
well, in gentle manners, and harshly; it can be done with
any kind of combination of persuation, reward or punishment.
But to "rethink and refeel our nature and destiny" is to
ask for more than a change in attitude: it asks for a total
reorientation of the purpose and destiny of the whole western
exercise. The conclusion more easily arrived at would, hence,
be that structures should be changed, at least controlled,
and then people can be left with any kind of attitude, ideo-
logy or cosmology they might have within those structures
as long as they do not express it in behavioural terms. As
a matter of fact, much of western political doctrine is based
on this assumption: create the right structure (whether of
the liberal "countervailing balances" type, or the Marxist
classless type; fill people into it and they can either have
whatever attitude they want provided they respect the struc-
ture, or they will eventually end up with the right attitude .
In general structure and social processes are seen as primary,
attitudes as secondary. This may be correct for more super-
ficial attitudes, such as expressed in political party pro-
grammes; but it is hardly correct for deeper, collectively

shared assumptions of the type that can be referred to
as cosmology.

Consequently, one tentative conclusion might be as
follows: even if we cannot in the short run hope that
our most basic attitudes to nature will be changed ,among
other reasons because they are collectively rooted, we
could at least increase our awareness of them. The problem
of "cultural outer limits" does not necessarily have to
be conceived of as a problem of stamping out certain ways
of thinking as illegal, introducing new ones. It can also
be conceived of as a problem of lack of consciousness,
a collectively shared unawareness which would, then, be
particularly pronounced in large scale alpha-structures
since there is such an obvious linkage between western
assumptions about nature and how these structures treat
nature. Given this it might be warranted to have the some-
what optimistic view that increased awareness will serve
as a brake: like in psycho-analysis some insight of rela-
tionships between deeply hidden forces in the mind and
behavioural expressions this type of socio-analysis might
have a salutory influence.

5. <u>Social outer limits: summary and attempts at synthesis</u>.

So far we have identified **four** variables that can be used to lay down social outer limits:

(1) the number, N, of members of the society relative to natural resources;

(2) the degree of exploitation;

(3) the degree of Beta predominance or Alpha predominance in the Alpha/Beta mixture of structures.

(4) **the degree of nature-distant cultural bias in the society**

A **fifth** type of variable of a more dynamic nature can now be identified: the <u>degree of elasticity</u> of the system.[37] By this is simply meant the society's ability to react when nature's outer limits or man's inner limits are overstepped, by adequately counteracting the causal agents of such trespasses. Thus, imagine that depletion and pollution are increasing, in a very poor, Beta dominated society. In that case the ability to build **Alpha** environment-protective agencies becomes a key **issue**   , and such structures should increase more quickly than the environmental deterioration.   And correspondingly if Alpha has gone too far: there should be an effort to regenerate or generate anew smaller action groups for a better environment. Needless to say, today we know better how to do the former than to do the latter, and the latter may even look counter-productive, given today's socio-cultural setting and the difficulty many people will have in imagining a variable with two limits, one lower and one upper, in those ends. It may very well be that cultures capable of formu-lating <u>in media res</u> would have been better at this, **and this is precisely where Western culture is at its weakest.**

The same can be said about degree of exploitation and the level of population pressure: to what extent is the society able to make for changes in such variables when danger signals abound? There are probably some important interaction effects here, for instance to the effect that the higher the degree of exploitation, the more will an increase in population pressure lead to environ-mental deterioration because of emergency actions not sufficiently mindful of the delicate nature of many such balances. **To be more spe-cific: the ruling elites will simply not care.**

It will be noted that in the above we have made no reference to such political dimensions as democratic/authoritarian rule. Today either type tends to become technocratic, ruled by alliances

of bureaucrats, capitalists and researchers who will all tend to
favor Alpha structures over and above Beta structures.[38] By and
large it is not very likely that they will readily accept an idea
of upper limits to the type of structure they themselves have
vested interests in. And yet this insistence on an upper social
limit where the predominance of Alpha structure is concerned may
well be socially important in the future, particularly if one
assumes that there is something to the idea that an access of
Alpha structures with its loneliness, alienation, over-specialization
and vast numbers of members is not only related to the incidence
of mental illness, but also to the incidence of cancer by psycho-
logically predisposing people so that carcinogenic substances have
more of a "bite".[39] The latter example, incidentally, also
illustrates how Figure 2 should be seen as a triangle, not only
as three arrows, **with the underlying cultural ethos leading attention
away from the warning signals from nature.**

Having tentatively identified **four** variables in the quest
for social outer limits and a **fifth** "meta-variable": society's
reaction speed when the limits are approached on the other **four**
variables - the question of a suitable set of indicators arises.
How would one measure the situation in order better to assess
where one stands? Roughly speaking there are **four** approaches to
this question, a human needs-oriented approach, a **nature**-oriented
approach, **a society-oriented approach, and a combination of them.**

The human needs-oriented approach would simply take as its
point of departure the level of satisfaction of human needs in
society and declare a state of emergency if the percentage of
those below the minimum level of need satisfaction is above a
stipulated upper limit. In other words, society's outer limit
would be the same as the human inner limit. If more than x percent
are below the poverty line, this means that society has gone
beyond its limit; and if more than y percent are mentally ill,
the same conclusion would be drawn. The chain or configuration of
causation would not matter in this connection; and that is of
course the weakness of the approach: it would not serve to give
warning signals beforehand, of a societal nature, before the
tendency to overstep society's outer limit show up in terms of the[40]
effects on the members of society.

The second approach would start with **nature's** outer limits,
and stipulate upper limits to the **level of depletion and pollution,**

their possible rates of increase, at various levels of social organization around the world, and then go on to deeper aspects of the environmental problématique, probing into levels of homeostasis and diversity - in other words into maturity of the individual ecosystems.[41]

The third approach would try to stipulate society's limits in terms of the five factors given above. It would have to start with the reflections on the number of members of the society relative to the amount of nature that society has legitimate access to, which in itself is a rather problematic concept. As a matter of fact, this particular difficulty is probably in and by itself enough to throw out this particular approach. Imagine a group of people, given the forces that have emerged during history, has been forced to live within a rather limited area. Does that mean that this group of people for ever will have to adjust its aspirations to that particular piece of nature ? In earlier ages, when borders were not so clearly drawn and people perhaps thought in terms of nature's local outer limits,but certainly not in terms of global outer limits,such problems could be solved by means of migration. There must have been an implicit concept to the effect that nature belongs to everybody and hence to nobody. Consequently, a much better line of reasoning would be to ask what the objective situation of that human population is, and to explore how a better symbiosis with nature can be obtained so as to enhance its level if that is needed - possibly transcending the limits of that society, and for this there are many methods out of which belligerent conquest is only one. An exploration of this type of reasoning would then lead to an analysis of the global social system and Planet Earth carrying capacity. In recent years this type of analysis has increasingly been made use of, and will sooner or later be accompanied by a new ethos according to which the resources of nature are seen as belonging to human kind in general. After all, this kind of transition in cultural bias took place from the local level to the national level; there is no reason why it should not also take place from the national to the global level. [42]

The degree of exploitation, the degree of beta or alpha predominance and the degree of nature-distant cultural bias are somewhat less problematic. The first can be explored through distribution analysis,

the second through structural analysis, and the third probably through in-depth attitudinal analysis - perhaps focussing on those who have most as a result of the social distribution, and are located most centrally in the alpha structures. Altogether this would lead to 24 different societal types, from the ideal one with a low population, low level of exploitation, an adequate alpha/beta mix and a cultural bias of closeness to nature to the worst possible combination where there is a high level of population pressure exercised in an exploitative society of either the pure beta or pure alpha varieties, and with a nature distant cultural bias. One could then try to order the 22 in-between types by means of an additive index of favourable characteristics, probably the simplest approach here. But it is doubtful whether one characteristic might compensate for an other; in other words whether the index is really additive.[43] More important would be the idea of introducing the fifth variable, level of elasticity in reacting to danger signals, getting a total of 48 types. However, this is not a question of combinatorics nor the question of to what extent a good position for a society along the fifth dimension is sufficient to compensate for moves towards the social outer limits on the other four dimensions. About this we simply know too little; much more research is needed.

However, there are two difficulties with this approach. First, it will very easily tend to become social dogma because it does not have a sufficiently direct reference to the concrete human situation. Everything social is complicated, and the variables given here, although probably necessary, are certainly not sufficient to give a good image of the situation. The bureaucratic response would be to see them as **four or five** goals to be realized, regardless of whether their realization really constitutes a sufficient basis for meeting human needs. Thus, some time ago a level of economic growth above a stipulated lower limit would be seen as a sign that the society is healthy and hence capable of solving its problems; to others a high proportion of public to private property, particularly in the field of means of production, would have the same significance. From the perspective taken in this present analysis they may both be said to suffer from the same deficiency: lack of ability to understand the negative implications of a predominance of Alpha structures in society. Consequently they were not equipped with conceptions of

upper limits, perhaps one reason for the insufficient attention given to matters of the environment and non-material needs. But [44) any perspective will suffer from lack of attention to something and, consequently, should always be subject to revision - and this would be particularly true when the perspective is anchored in a social level rather than human level analysis - if for no other reason simply because of the danger of excessive abstractionism.

   The second difficulty would be that the limits stipulated will be past-oriented. They might, for instance, be derived from a synchronic analysis of the situation in a number of societies today, trying to arive at limits from the scattergrams using the social variables mentioned as independent variables and level of human needs satisfaction as dependent variables. But empirical data are reflections of the past, and even if the variables should remain critical and significant the relations between them are always likely to change due to changing circumstances. One may argue that human beings will starve below a certain level of calories per day regardless of the circumstances. But this would not hold true for the size of the population: with changing technologies the critical size given a constant nature may also change, and not necessarily upwards. The further one is removed from concrete basic needs satisfaction of individual human beings, the less absolute any borderline and the more past-oriented will this approach be, permitting the conditions of the past to throw a heavy shadow over the future.

   The **fourth** approach would combine the **three** approaches already mentioned, and in addition supply a bridge between them in the form of a theory. All **four** parts would be open to constant revision, all the time insuring that the purpose of the social indicators would be a satisfactory development along the human indicators, not to try to cultivate a good, even perfect society per se (just as for the case of nature simply because we would not know what that would mean). Today we are not in a position to do this, not so much for lack of data as for lack of adequate theory, and not only empirical theory, also normative theory. Thus, what is an upper limit where degree of exploitation is concerned? Zero? Hardly, even if one does not tolerate that the

upper ten percent have six times as high income as the lower ten
percent, one might tolerate that they have 1.6 times higher income.
But who is this "one" who tolerates or not? Do we have other
criteria than the extent to which it is acceptable? In the
absence of such criteria the best we can do will probably be a
carefully chosen empirical approach, always open to revisions with
new data and new experiences. **In the conclusion we shall try to
give some ideas of concrete program activities in this field.**

6. Conclusion: possible program activities in this area.

The area is very broadly designed, and program activites could go in all possible directions. However, the following are some relatively concrete proposals.

(1) Exploration of warning signals

If we accept that the concept of social outer limits should build on the notions of human inner limits and nature's outer limits, then the question becomes to what extent there are warning signals when these two types of limits are transgressed. There are probably reasons to believe that the best warning signals in the sense of arising consciousness, even mobilising action, are found within the price mechanism. People are probably less able to tolerate rising prices than arising proportion of the population below the poverty line (including people unemployed), or an increasing incidence of mental illness. And the same applies to nature's outer limits, as long as they are not translatable into something immediate; directly hitting people here and now, warning signals do not seem to be very effective.

Hence, there are two important activities that could be engaged in. One would be simply to explore among people in general, and decisionmakers in particular, under what conditions they think that things are going wrong. In other words, what are their limits? How many would have to have their basic needs not met in order for people to feel that limits have been transgressed - and what kind of people put the limit where? Similarly for nature: how does nature have to look (smell, tremble) before people feel that limits have been transgressed?

The second problem would be more constructive, less empirical: how to select warning signals, indicators to look for so as to have action consequences. Knowing what symbols are important to people it might be worth while to channel warning signals in that direction. Thus, people will probably take pollution much more seriously if it expresses itself in the form of cancer than when it is "only" translated into poverty terms - one reason being that cancer hits everywhere in society, poverty only at

the bottom (more or less by definition), hence among the less powerful. In short: which are the most effective warning signals, knowing well that all this may change with changing ethos?

(2) **Exploration of what kinds of action are prompted by what kind of warning signals.**

The point here would be to find out what people _do_ when warning signals are present. What kind of people engage in local action, what kind of people in national or international level action - including the idea of calling for such action. Concretely this would be a question of analyzing case studies, particularly of the many environmental actions that have taken place during the last years. In general, descriptions of environmental action may give the best material for more prescriptions about such action.[45]

More particularly, it would be important to know what impact the relationship between Alpha-structure and Beta-structure has in this connection. If there is very little available alpha-structure people will probably engage in micro-level action, and use the type of warning signals that are produced by changes in ecological cycles at that level. But if such Beta-structures do not exist it is probably still true that the same warning signals, relatively local, are the only ones that make people really react - the problem then would be where to go? Will a society poor in local structures be so dependent on an overburdened, perhaps rigid bureaucracy that only the warning signals remain, but they are no longer taken seriously because people do not think that acting upon them would lead to any improvement? In short, do alpha and beta warning signals and types of action actually belong to two different worlds?[46]

(3) **The translation of all this into social warning signals.**

As pointed out in the main text,[47] the difficulty with our basic assumption is that it may lead us to the idea of having to wait for negative consequences to show up in nature or in human beings before one dares act. Is there any way in which one could simply classify societies today according to the five variables mentioned, particularly the first four , relate those variables to the degree of transgression of human inner limits and nature's outer limits, and make use of such findings as might arise as at least a preliminary guideline? This would require relatively good data on the level of human needs satisfaction and ecological balances, and also good data on the

Alpha/Beta mix, the degree of exploitation in society, and the level of population pressure. The latter might actually be the most problematic one, given the difficulty in defining the amount of nature that belongs to a given society. One approach would of course be to say that this is the nature within the confines of that society - in other words what the population would have to live on or off, had there been no trade or generally economic exchange across borders at all.

All together these three program activities should constitute a very well balanced total approach to a difficult field - but given the importance of that field it might perhaps be advisable to go ahead as quickly as possible in such directions. This might also give some new insights into the level of elasticity of various societies, simply by comparing the rate of change in environmental indicators with the rate of change in environmental action, both of the institutionalized Alpha variety and of the more voluntaristic, spontaneous Beta variety. [48] What is the relation in the rate of change for environmental deterioration and for environmental action, over time? Do they both grow? If so, at the same speed, or does there have to be a major eco-disaster before a machinery is built? [49] If they both grow, is that necessarily a sign of health of the society?

(4) <u>Are environmental problems structurally specific ?</u>

In the early days of the environmental debate, during the late 1960's there was a tendency on the political left in western societies to place the burden of blame for environmental disasters on private capitalism. To a large extent this is probably correct: modern large-scale capitalism has built into it alpha magnitude destructiveness at the same time as the regulatory forces between these alpha units may be insufficient. But the socialist regimes did not seem to have taken the warning signals very seriously either. Hence, one entered a period where the blame was shared more equally by capitalist and socialist societies. However, exposure to some of the Chinese experience in the early 1970's seem to

indicate that these variables are not very well chosen and that thinking in terms of something like the present paper's alpha/beta distinction might be more useful. On the other hand, from the proposition that "big is ugly"(meaning that alpha leads to environmental deterioration, whether capitalist or socialist) it does not follow that "small is beautiful" (meaning that beta necessarily leads to environmental protection). Experience seems to tell a different story.

Out of this kind of reasoning – very tentatively sketched above – one might come to the conclusion that it does not make much sense to attribute all environmental deterioration to one particular structural type. What might make sense would be to ask the question: What type of structure makes for what kind of environmental deterioration ? It is not enough to say "man-made"; it might be useful to know through which kind of social structure man has been able to cause such and such environmental deterioration. And once that question is asked and is answered in a reasonably documented manner – by systematically tabling sources of depletion, pollution, destruction of homeostatic mechanisms and reduction of diversity – environmental action might become structurally more specific. The hypothesis of the present paper is that that kind of thinking will reinforce the idea of an optimal range between pure alpha and pure beta as the most adequate type of social structure, but it might be useful to be able to specify that range somewhat better.

More particularly, this could also lead to reflections concerning the adequacy of any type of environmental management suggested. If pure structures of one type or the other is seen as less than adequate from the social outer limits' point of view, because of failure to meet human inner limits and/or nature's outer limits, then environmental management based on only one of these structures should be regarded with suspicion. The hypothesis that such management would reproduce the difficulties or problems that gave rise to the organization in the first run , only in some other form and possibly in an other corner of the world, would have to be effectively falsified for such organizations to warrant serious public support.

(5)   Environmental management from an ecological point of view .

        Ecological reasoning can be used to explore environmental management as such. More particularly, any ecologically aware person should ask two questions about environmental organization: does it harbour sufficient diversity ? and does it have an inbuilt homeostatic mechanism ?

        As to diversity: this is exactly the characteristic that might be reduced in the natural life-cycle of an organization, contemplating alternatives of action, narrowing the range of action as decisions are made cancelling one possibility after the other, establishing routine patterns and uniform practices, eventually all over the world. Since an organization will tend to prefer the type of action that reproduces the structure of the organization itself it is unlikely that an alpha organization will recommend beta action or vice versa. In the case of the alpha organization this is then reinforced by the tendency of science to deliver universal propositions and the tendency of bureaucracy to produce universally valid (or at least relevant) regulations.

        As to the homeostatic mechanism: as in ecosystems in general it will have to be of such a kind that the system can survive environmental changes. In other words, we are back to the elasticity approach, but with the added hypothesis that a high level of diversity will add to the elasticity if the system of environmental management is taken as a whole. In other words, a country that wants to know how well protected it is against transgressing social outer limits would do well to count among its resources not only alpha-type ministerial/corporate environmental management, but also (potentially beta type) citizens groups serving as amplifiers for warning signals, translating them into environmental action and demonstrations, sometimes even directed against the environmental agencies. Obviously, lucky is the country that has a broad scope of defence mechanisms against potentially irreversible environmental deterioration. And the research problem in this connection would be to find out to what extent the alpha and beta approaches where protection of environment is concerned constitute a total system of environmental defence, and to what extent they can be said to work at cross-purposes.

N O T E S

1. In "NOTES FOR THE BRIEFING SESSION ON BASIC HUMAN NEEDS AND
OUTER LIMITS", Nairobi, UNEP, the following definition is given:
"Outer limits are conceived as those limits of adverse changes
in the state of an individual ecosystem which if exceeded the individual
ecosystem (or the environment as a whole) would lose its efficiency
as a part of the human environment. For the environment as a whole,
outer limits could also be conceived as the state which if reached,
the whole environment would not be suitable for the survival of
human beings". The definition is clear, it should only be noted that
it is anthropocentric ("not be suitable for the survival of human
beings"); and that it opens in its emphasis on "an individual eco-
system" for distinctions between different levels of outer limits:
global limits, regional limits, national limits, local limits, etc.

UNEP has been focussing on five particular "aspects of a general
nature of the outer limits' concept: climatic changes, weather modi-
fication, risks to the ozone layer, bioproductivity and social outer
limits. As to the latter there is the important decision of the Fourth
Governing Council in its 57th meeting 13 April, 1976:

> "Authorizes the Executive Director to develop
> activities under the"Social outer limits" in
> association with other relevant activities of
> the programme" – – –

In the discussion at the Fourth Governing Council (see para 214) one
speaker found this concept   "innovating and promising, even if
complex"; there were comments on "the potential value of the concept
and the appropriateness of the sociological element within the con-
text of other programme activities, while cautioning that it should
be carefully defined and appraised before any major activities were
undertaken".

In another document (UNEP/GC/90 comments on "Social Outer Limits"
are more explicit. Thus, it is pointed out about social outer limits
that they are likely to be of great importance in promoting alterna-
tive, more environmentally-sound patterns of development and life-
styles". And the document goes on, pointing out (para 151): "Though
the concept of social outer limits is still at a formative stage it is
clearly of greater practical value if viewed in relation to changes
in the physical environment. Accordingly, the interpretation that was
put forward at the fourth session of the Governing Council was :
(Limits to)"the rate at which society can change in accord with en-
vironmental constraints or environmental requirements. "

In another document (GC/61) this concept of "rate at which society
can change" is taken somewhat further. Thus, it is seen (para 5) as
the "limit to the rate at which society can adapt itself to a changing
environment without social disruption" But, as will be pointed out in
this paper, section 2, this is problematic: it presupposes a relatively
clear definition of the social system as such, otherwise one would not
know whether it is being disrupted or not. But then the document goes
on adding a second dimension (para 5,b): "The rate at which society
can modify its values and practices in response to environmental im-
peratives". Whereas the former was a question of society itself dis-
rupting the latter is a question of the ability of a society to modify
itself in response to possible environmental disruption. It is usually
this second interpretation that will be picked up by environmentally
concerned organizations.

The same paper goes on, summarizing: "Social outer limits can be defined, therefore, as the rate at which society can change in accord with environmental constraints or environmental requirements" and it adds, carefully, that "it is unlikely that a cross-culturally valid, absolute index of social outer limits can be developed, given the historical and structural differences between societies". The latter point may be correct, although it can be held against almost any effort in any field of index construction.

This "rate of change" approach is interesting, but can be criticised. First of all, it does not say anything about the absolute level at which the society functions, it is only geared towards societal adaptability relative to environmental constraints. One could easily imagine a society at a substantial level of exploitation of man and nature, and level of dissatisfaction in general, yet able at that level to change and adapt itself so that the situation at least does not deteriorate further. Second, the image given by this way of talking is too negative: the image of a society waiting for problems to pop up, then adapting itself. A much more positive image of societal goals can also be given, inspiring developmental policies that at the same time would reflect environmental constraints or limits.

In yet another document (UNEP/24 November 1976; "Basic human needs / Outer limits") social outer limits are related more explicitly to basic human needs, and the concept "Social environmental degradation" is made use of. It seems to be defined emplicitly in terms of the "numerous factors at work interacting in complex ways which might cause social environmental degradation", such as:

(a) Prevalance of acute poverty and humanly degrading living conditions for large sections of the population, especially in developing countries;

(b) Great inequalities in consumption, in ownership of assets and in income-earning opportunities within countries, both developing and developed; and

(c) Alienation of the individual from the society caused in part by ubiquitous primacy and unrelieved atomistic pursuit of material gain, by widespread automation and by organization of production and settlements on very large scales.

The document then goes on picking up the second interpretation in the preceding concluding that: "In view of the ambiguity introduced by the indetermincy inherent in the two points of reference, ("environmental imperatives" and "capacity of a society"),of the foregoing interpretation, effort to ascertain and monitor social outer limits in a general way may not be very rewarding - - -"

In the present paper the effort will, as mentioned, be made to be reasonably consistent with these conceptualizations, yet trying to clarify further and to be more specific about dinensions along which social outer limits may be located.

2. Still another example, and that will constitute the major content
   of the present conception of social outer limits, would be these
   "disastrous policies" themselves. A society which for some reason
   or an other persists in anti-human practices obviously can be said
   to have come close to or even to have transgressed some kind of
   social outer limit.

3. This may actually be one reason why there seems to be less interest
   in environmental matters than was the case five years ago. A certain
   overselling of ecological concerns probably took place and "outer
   limits" were conceived of like case (a) in the text, certainly not
   like case (i). In other words, there was a promise of imminent cata-
   strophy, but the catastrophy failed to appear, or at least not in
   the abrupt manner indicated. It is actually probably wrong that
   warnings in order to be taken seriously have to be formulated as if
   case (a) is the correct model - when this nevertheless is done it is
   not surprising if people start paying less attention to warnings.

4. The idea of disintegration, somatically and/or spiritually, might
   be seen as a part of the definition of needs. Another part would
   contain an element of universality. In other words, a need differs
   from a want by the consequences of non-satisfaction: a high level of
   disintegration, and a high level of universality. These concepts are
   very much made use of in the Goals, Processes and Indicators Project
   of the Human and Social Development Programme of the United Nations
   University, and one tentative list of needs, material and non-material,
   developed by the present author is as follows: (see next page)

5. In one of the documents quoted in footnote 1 above (UNEP/GC/90,para
   125): "Outer limits apply at various scales. Examples at the global
   level include climatic change and threats to the ozone layer. Outer
   limits of a regional nature would be approached when the health and
   productivity of grazing land is on the point of collapse because of
   desertification, or weather modification activities create a danger
   of distorted regional climatic patterns which could seriously affect
   food production. Outer limits exist, too, at local scale; for example
   a lake which is threatened with eutrophication or parts of a human
   settlement where environmental conditions are so bad that they begin
   to create intolerable social pressures."(italics ours)

6. Just to indicate one line of reasoning here: imagine there is a cer-
   tain breakdown in the metropolitan administration of a very big city.
   The citizens have to organize themselves better, simply in order to
   survive. In fact, the situation might have some characteristics in
   common with what happens during a war. People are thrown back upon
   their own resources, and in such cases usually organize in small groups,
   defined by neighbourhood, kinship, shared values and interests. Using
   the scheme given in footnote 4 above the net result is very often an
   increased level of identity, possibly also an increased level of secu-
   rity because of internal mechanisms of protection, usually a decreased
   level of material well-being, possibly also a decreased level of free-
   dom. However, if material well-being and freedom were the needs best
   satisfied for the elites before the city became "ungovernable" the
   class aspect of statements of that kind becomes more clear.

7. Such border lines exist, indeed, this is the function of social ideo-
   logy. The theory of democracy states that a social outer limit has
   been transgressed when democratic mechanisms no longer are operating.-
   leading to a variety of different interpretations depending on the

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7. Such border lines exist, indeed, this is the function of social ideology. The theory of democracy states that a social outer limit has been transgressed when democratic mechanisms no longer are operating.- leading to a variety of different interpretations depending on the

definition of these mechanisms. Correspondingly, the adherents
of "capitalism" or "socialism" would probably both draw some line on
the continoum from 100% to 0% private control of the economy (e.g. in
the sense of the possibility for private individuals and firms to buy
and sell means of production on the market), and refer to that line
as a social outer limit. They may not draw the same line, however; for
that reason both of them may be found competing for votes in a democratically
functioning society operating within the overlap between the two regions
defined as acceptable by either party . But this is not what will be
referred to as "social outer limits" in the present paper. For sure that
concept should have a better anchoring in something more objective than
current socio-political ideologies.

8.

In general I would agree with a spirit expressed in "A Blueprint for
Survival",(The Ecologist, January 1972, p.15 para 265) - also because
it has the courage to include some statements about numbers:

"Although we believe that the small community should be the basic unit of
society and that each community should be as self-sufficient and self-
regulating as possible, we would like to stress that we are not propo-
sing that they be inward-looking, self-obsessed or in any way closed to
the rest of the world. Basic precepts of ecology, such as the interre-
latedness of all things and the far-reaching effects of ecological pro-
cesses and their disruption, should influence community decision-making,
and therefore there must be an efficient and sensitive communications
network between all communities. There must be procedures whereby commu-
nity actions that affect regions can be discussed at regional level and
regional actions with extra-regional effects can be discussed at global
level. We have no hard and fast views on the size of the proposed commu-
nities, but for the moment we suggest neighbourhoods of 500, represented
in communities of 5,000 in regions of 500,000,represented nationally,
which in turn as today should be represented globally. We emphasise that
our goal should be to create community feeling and global awareness,
rather than that dangerous and sterile compromise which is nationalism."

9. This point is argued in Johan Galtung and Fumiko Nishimura, Learning
from the Chinese People, Oslo, 1975 - the chapter on People's Communes,
also reprinted in CERES, 1976.

10. From the dialogue The Laws. It will be noted that 5040 = 1.2.3.4.5.6.7,

11. Admittedly this is an anthropocentric position, but it is the only one
we feel capable of having. As pointed out in footnote 1 UNEP documents
also reflect this anthropocentrism.

12. The arrows in figure   end up in the human corner, as indicated
    in the preceding footnote. However, it should be noticed, that
    Protagoras did not necessarily mean that everything should be evalu-
    ated in terms of its impact on human beings. He may also be inter-
    preted to mean that a human being has his or her own scale of measure-
    ment, not necessarily yielding the same measure. But this subjectivistic
    interpretation is in a sense only a special case which should sensi-
    tize us to the difficulties in arriving at any type of consensus about
    indicators; it does not rule out the significance of human beings as
    basic in arriving at conclusions about social outer limits – possibly
    also about nature's outer limits.

13. The word ecology refers to this concept.

14. For more details on this, see Johan Galtung, <u>Development, Environment
    and Technology: Towards a Technology for Self-reliance</u>, Geneva,UNCTAD,
    1978, chapter 1.D and chapter 3.

15.
    In his contribution to the Economic Commission for Europe Task force
    meeting, Bilthoven, 12-15 September 1977, F.de Beaufort gives some images
    of the ecological destruction suffered by animals and plants during the
    last century and millennia: "Les pertes génétiques vont en s'accélérant;
    une espèce de mammifère disparaissait tous les 50 ans entre Jésus-Christ
    et l'an 800; une tous les 18 mois de 1800 à 1900 et une par an depuis 1900.
    En France, et à peu de choses près en Europe, il a disparu 1% des espèces
    végétables depuis 1900 tandis qu'aujourd'hui 10% sont menacées et 30% en
    forte régression – les espèces exploitables par l'homme le sont jusqu'à ce
    que la baisse de leurs populations soit telle que l'exploitation n'est plus
    rentable = c'est ce qui s'est produit par les cétacés (baleines et cacha-
    lorts). En fait chaque espèce animale ou végétale représente un indicateur
    de la qualité et des potentialités du milieu dans lequel nous vivons et
    chaque disparition est un signal d'alarme." No doubt man should take a
    warning from what happens to the animal and plant worlds, man himself not
    being that dissimilar from them. On the other hand, it is also a sym
    an attitude of superiority towards the rest of nature when man makes use of
    animals and plants as indicators. Although hard to prove an intuition might
    be that this attitude itself may be as ecologically destructive as the fai-
    lure to understand such indicators. In other words: anthropocentrism
    should be challenged.

16. For the concept of maturity see <u>Perspectives in Ecological Theory</u> , by
    R. Margalef, Chicago, The University of Chicago Press,1968,pp.37-44.

17. Some examples of the man-made impact on the environment

    Edward Goldsmith in his review of "the Reykjavik Conference on the
    environmental future",(<u>The Ecologist</u>, July 1977, pp.206-209) "Letitia
    E. Obeng of UNEP are saying that "an increase in temperature of 2%
    above average, in tropical waters, can totally disrupt a marine eco-
    system, while a 3% change can eradicate most of the economically impor-
    tant fish in the tropics". The important point, according to Goldsmith,
    is the way in which changes in the climate are seen as man-made: "Four
    years ago only Reid Bryson seemed to accept the principle that current
    weather changes were largely due to human activities. When he explained
    the drought in Sahelia in those terms, he was bitterly criticised by
    many of his colleagues. Today the mood has changed." And Goldsmith con-
    tinues: "A further important fact is deafforestation, its effect is to
    cause a considerable decrease of albedo. What is more it reduces the

capacity of forests to absorb the carbon dioxide emitted by our activities. Forests in fact, rather than being a sink for carbon dioxide are rapidly becoming a source of it. The same, of course, is happening to oceans. In normal conditions as much as 50% of the carbon dioxide we generate is absorbed by them, but their capacity to do so is being reduced, partly because they are being warmed and partly too because of their acidification by man-made pollutants." That particular Conference in a paper by Borgstrom also introduced"the notion of "Population equivalents" in which the impact of livestock is reduced to human equivalents. If one does this one finds that the globe is currently not inhabited by 4.2 billion humans but by 21 billion consumers. This is a more correct estimate of the "feeding burden" that green plants must carry." And Goldsmith goes on quoting Borgstrom as saying: "Making deserts bloom is one of technology's masterpieces. Yet man has, at the same time created a five times larger acreage of deserts or some 1.2 billion hectares, whether through negligence, ignorance or sheer pressure of numbers in man and livestock. This transcendence of ecological limits is an on going process."

18. Lacas, in his article on Quiroga, in The Americas, vol.14,no.1,pp.57-86 makes some use of the finding by Doxiades,i.e. that there are 14.10^6 human settlements in the world,that 53.5% of the world population lives in rural settlements, including 4.10^6 single farms and 10.10^6 rural settlements with less than 5.000 inhabitants. Above that there are 32.700 settlements with more than 5.000 inhabitants, 1.460 above 10^5, 141 with more than one million and 3 megalopolis (with more than ten million). These figures are now a bit old but the general conclusion still holds: it is normal in the sense of frequent for human beings to live in relatively small settlements.

19. See the report on the "State of the Environment",prepared by the Executive Director of UNEP, Dr. M.Tolba, 1977.

20. Thorough research on this matter is reported in the Ecologist, Vol.7, No.1, 1977. For a summary of literature on the possible relation between the incidence of cancer and psychological factors, see the article "The Crab" in the New York Review of Books,June 9, 1977,pp.10 ff.

21. This problem touches on the very definition of the concept of "needs" - see footnote 4 above.

22. The word "hostile" should, however, be used with care. Man has shown ability to adapt to the most incredible environments. These environments have, however, been natural, not man-made or artificial. One day we shall probably be able to understand better what this difference means - only that it looks as if it has to become even more artificial for the impact to show up clearly.

23. In the UNEP document on "Social Outer Limits" (GC 61,para 8) this type of thinking is referred to under "Issues related to inequality" (a politer term for "exploitation"). "Pollution of Poverty" is contrasted with "Pollution of Over-consumption", and comes close to saying that the latter may be a major cause of the former - with which most analysts would probably agree (except that the latter is not only found in "industrialized or heavily urbanized countries", but also in the elite sectors of less industrialized and less urbanized countries). It is because of this relationship that the present paper would only accept the notion of population pressure relative to a reasonably egalitarian society. Moreover, in an inegalitarian society limitation of the overconsuming population will ob-

viously have a much more positive impact on the environment than
planning way poor people who consume very little.

24. For one effort to look into this, see Johan Galtung,
    "Culture, Structure and Mental Disease", Papers No.42,
    Chair in Conflict and Peace Research, University of Oslo, 1977.

25. This is elaborated in some detail in Johan Galtung: "The Dynamics
    of Rank Conflict: An Essay on Single vs. Multiple Social Systems",
    Papers No.47, Chair in Conflict and Peace Research, University of
    Oslo, 1977.

26. The theme of expansionism in Western culture is developed in some
    detail in Johan Galtung, Tore Heiestad and Erik Rudeng, "On the
    Last 2500 Years in Western History, and Some Reflections on the
    Coming 500" — prepared for Volume 13, New Cambridge Modern History,
    forthcoming.

27. An hypothesis about Japan, possibly also China (even post-Mao) would
    be that this is to some extent what is being done, and may serve to
    explain the lower incidence of personal and social disintegration
    like mental disorder, suicide, crime, alcoholism, etc.

28. And these are the rivalries that may lead to the "tragedy of the
    commons" — there is no regulatory level that can stipulate limits
    for each Beta unit for the consumption of "man's common heritage" — the
    air and the water, the oceans, the non-claimed nature — and for that
    matter also the claimed nature, if one accepts the idea that human beings
    are but guests,visitors, and should act accordingly.Thus, Alpha has a
    number of tasks that should not be belittled: regulation of competition
    among Beta units, to serve as a medium in which the Beta units can
    engage in exchange for mutual enrichment, protection of each indi-
    vidual Beta unit against external enemies, against other Beta units
    and against the hazards of nature.

29. This is particularly true for Amercian social science, where "nation-
    -state" building, and more particularly large-scale implementation
    of the Alpha model of social structure for a long time was accepted,
    rather unquestioningly, as the model of development. One Alpha struc-
    ture would not be capable of solving, given some time and experience.
    Only recently has there been systematic social science efforts to show
    how the Alpha structure generates problems, often even of the same
    kind it tries to solve. No doubt the name of Ivan Illich will stand
    in the history of social science as a focal point in this approach.

30. As an example of a rather forceful Illich thesis summarizing much of
    this (unfortunately, some of the impact gets lost when attempted
    translated into other languages: from Technologie und Politik, 9,1977,
    p.5: "Die zeitraubende Beschleunigung des Verkehrs, die verblödende
    Erziehung an den Schulen, die selbstzerstörerische militärische Ver-
    teidigung, die desorientierende Information durch die Medien, der
    heimatlos machende Wohnungsbau, die pathogene Medizin, alles kann als
    eine Folge der industriellen Ueberproduktion begriffen werden, die das
    autonome Handeln lähmt. Um diese spezifische Kontraproduktivität der
    modernen Industrie zu verstehen, müssen wir sie klar von zwei anderen
    Kategorien der ökonomischen Belastung unterscheiden, mit denen sie oft
    verwechselt wird, nämlich dem sinkenden Grenznutzen und der negativen
    Externalität."

31. One may speculate why this is so. Economic units may possibly be explained because of the economies of scale and other units because of possible economies of administration; but then both of these theories may also be seen as rationalizations of the quest for power by those at the top. After all, no complex social science was needed to try to explain why kings and other feudal lords tried to expand their realms, and the same may apply to any institution, including social science insitutes and environment agencies.

32. See The Social System, Glencoe, The Free Press, 1951.

33. The book by Charles Reich, The Greening of America, is exactly about this dilemma.

34. This is actually an hypothesis that can be tested: the global problems of outer limits are Alpha generated; the local ones may be Beta generated. The hypothesis is worth exploring systematically.

35. This is also an hypothesis worth exploring: to what extent will national environmental agencies serve so as to standardize local practices and international agencies so as to standardize national practices – according to objective physical criteria, but not – if the hypothesis is correct – according to social criteria ? And if this is so, does it not mean that bureaucracies use natural science as a tool to reduce diversity ?

36. In an article "The Future of an Affluent Society: The Case of Canada", (The Ecologist, June 1977, pp.160-194) Edward Goldsmith gives good examples of what it means to overstep "Social Outer Limits". "The number of alcoholics in the United States nearly doubled between 1958 and 1971, while that of alcoholics as a percentage of the population has more than doubled (from 2% to 4%)." "The number of suicides in the US has risen by 50% between 1955 and 1973. In 1973, 24.440 people are reported as having committed suicide. Only a proportion of suicides are registered as such. If all were registered it is estimated that suicide would rank as fourth or fifth among the causes of death. It is estimated that between 70,000 and 80,000 young people between the ages of 15 and 24 will attempt suicide in the US this year and between 3000 and 4500 will succeed. In Canada, as is apparent from figure 9, the suicide rate has doubled in the 49 years between 1921 and 1970." "And along with the rest of these problems, crime has risen in the US and the UK in the most dramatic fashion. In the US, the number of crimes rose in the ten years from 1963 to 1973 from 314.230 to 861.000, while aggravated assaults during the same period rose from 172.250 to 412.000. "If an industrial society provides an unsatisfactory social environment for its members, it is biologically equally unsatisfactory – so much so that it is giving rise to a new range of diseases – the so-called diseases of civilization. These include most forms of cancer, ischaemic heart disease, diabetes, diverticulitis, peptic ulcer, appendicitis, varicose veins and tooth caries. Their incidence appears to increase very much in line with per capita GNP, and their human costs are rapidly coming to be reflected in economic costs. Health costs are also increasing very radically in line with general demoralisation and alienation. Psychological problems are multiplying as are prescriptions for sedatives and tranquilisers."

37. In doing so we are picking up the idea of "rate of change" mentioned in several of the UNEP document quoted in footnote 1.

38. Moreover, they will all tend to be MAMUs (middle-aged men with university education), thus reducing the range of social experience and social perspective further.

39. See footnote 20 above.

40. Efforts to suggest indicators for all the basic human needs in the list in footnote 4 above have been made at the Chair in Conflict and Peace Research, University of Oslo and will be presented in Indicators for Development:Towards a Theory of World Indicators (Johan Galtung, Dag Poleszynski and Anders Wirak, Oslo 1978). The Goals, Processes and Indicators of Development project under the Human and Social Development Programme of the United Nations University will carry such attempts much further because of the global nature of the research program.

41. For efforts to suggest concrete indicators, see the reference given in the preceding footnote. This is also a part of the GPID project. Also see two articles by K.William Kapp, "Les Indicateurs d'environnement", Environment and Social Sciences, Vol.3, Paris, Mouton, 1973, pp.97-112 and "Environment and Technology: New Frontiers for the Social and Natural Sciences", Journal of Economic Issues, 1977, pp. 527-540.

42. For a very forceful presentation of this type of global ethics see Chief Seattle's Testimony, published by Pax Christi, London 1976: (p.4):

> "How can you buy or sell the
> sky, the warmth of the land?
> The idea is strange to us.
> If we do not own the freshness
> of the air and the sparkle of
> the water, how can you buy them?

The type of thinking is better known today than some years ago, but it can very well stand repetition.

43. An additive index would simply count the number of variables on which the society (or "social system") would be within acceptable limits, and as there are four variables the index would run from 0 to 4. It would lump together many different types under the other possible values, but they all seem both theoretically possible and empirically quite probable.

44. This is not so much because human beings are not omniscient,as because of the transcending nature of human society. A society equipped with a system for monitoring,say, social outer limits, will be a society different from the society for which the criteria for monitoring has been developed - unless some very basic criteria are made use of. Once more, this is the reason why we argue in favour of reductionism here, constructing the concept of social outer limits on the basis of concepts of human inner limits and nature's outer limits.

45. The work by Michael Royston at the Centre d'Etudes Industrielles in Geneva, analyzing a high number of environmental actions, is highly relevant in this connection.

46. This would, of course, be in line with the type of polarization hinted at in section 4: an Alpha ethos and a Beta ethos,in fact. Alpha people will only believe what the instruments and the computers tell them; Beta people only what their senses tell them. The combination is not an impossible one,but it should be better understood.

47. And in footnote 1 above, in the comments to the UNEP definitions.

48. The term "ecopolitics" is useful here. For one definition, the article by Mysterud,I. and Norderhaug,M. in _Norsk Natur_, no.1, 1971,where the following definition is given: It is "politics for development of the society, oriented towards ecological information, and consciously aiming towards a lifestyle in harmony with the resources of the biosphere." The concept no doubt is relatively close to "ecodevelopment" , bringing in both environmental and developmental dimensions in a more conventional sense. The term "ecopolitics", however, has a connotation of something more active which is not immediately projected using the term "ecodevelopment".

49. One method that can be used here is bivariate diachronic analysis. For an exploration of the method, see Johan Galtung, _Methodology and Ideology_, Copenhagen, Ejlers, 1977, chapter 4.

50. The environmental agencies have not yet achieved such a magnitude that they can seriously be accused of depleting economic resources and polluting the world with reports – accusations that may, non-facetiously – be leveled against other bureaucracies.